REMARKS

Claims 20, 22, and 24-28 are all the claims presently pending in the application. Claims 1-19, 21, and 23 have been canceled. New claims 24-28 have been added to more completely define the invention.

Claims 20 stands rejected under §112, second paragraph. The claim has been amended above to overcome this rejection.

It is noted that the claims have been amended solely to more particularly point out Applicant's invention for the Examiner, and not for distinguishing over the prior art, narrowing the claim in view of the prior art, or for statutory requirements directed to patentability.

It is further noted that, notwithstanding any claim amendments made herein, Applicant's intent is to encompass equivalents of all claim elements, even if amended herein or later during prosecution.

Attached hereto is a marked-up version of the changes made to the claims by the current Amendment. The attached pages are captioned "**Version with markings to show changes made**".

Claims 20 and 22 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Hirata (U.S. Patent No. 5,953,093 A) (hereinafter "Hirata").

This rejection is respectfully traversed in the discussion below.

I. THE CLAIMED INVENTION

Applicant's invention, as defined for example in independent claim 20, is directed to a liquid crystal display including a first substrate, a second substrate opposing the first substrate, liquid crystal molecules sandwiched between the first substrate and the second substrate, a plurality of pixel electrodes formed on the first substrate.

A feature of the present invention, in a non-limiting embodiment, is an alignment layer formed on the pixel electrodes which orients the liquid crystal molecules on the alignment layer to an alignment direction.

A further feature is that a plurality of differently oriented regions are formed in the

alignment layer on each of the plurality of pixel electrodes.

Additionally, each of the pixel electrodes includes at least one aperture formed under a boundary between the adjacent differently oriented regions of the alignment layer. The minimum width of the at least one aperture of the pixel electrode is equal to a width of a defectively oriented region of the liquid crystal molecules on a boundary of the adjacent differently oriented regions of the alignment layer.

With such features, a superior quality display having a high-speed response time and a low incidence of poorly oriented regions can be provided (e.g. see page 11, lines 25-27; page 12, lines 1-10; and page 13, lines 7-22).

An exemplary configuration of the aperture formed along a boundary between adjacent differently oriented regions is shown in Figs. 4 and 6 of the application.

The conventional systems, such as those discussed below and in the Related Art section of the present application, do not have such a structure, and fail to provide for such an operation.

Indeed, such features are clearly not taught or suggested by the cited references.

II. THE PRIOR ART REJECTION

A. The Hirata Reference

Regarding the Examiner's reasoning in rejecting claims 20 and 22, Applicant respectfully disagrees and submits that the Examiner's assertions are erroneous.

Firstly, while Hirata disclose an LCD with a plurality of differently oriented regions of liquid crystal molecules, the regions are formed after the LCD is fabricated and an electric field is applied between the two substrates forming the LCD panel. That is, in Hirata the liquid crystal molecules are oriented by an electric field.

Moreover, Hirata does not disclose or suggest an alignment layer which is oriented in a different direction. Thus, according to Hirata, a defectively oriented region of the liquid crystal layer does not appear on the alignment layer.

In sharp and fundamental contrast, the present invention relates to an LCD with an alignment layer which itself has a differently oriented region.

In the present invention, the liquid crystal molecules on the differently oriented alignment layer are oriented differently before an electric field is applied. This is because the liquid crystal molecules are oriented according to the oriented direction of the alignment layer itself, not an electric field.

Further, a defectively oriented region of the liquid crystal molecules appears on the boundary region between the differently oriented regions of the alignment layer. This is because the alignment layer is oriented by an alignment process such as by exposing ultra violet light (e.g., as defined by new dependent claim 28) more than one time from different directions. The defectively oriented region appears on the region where the light is exposed more than one time.

Also, the present invention may include an LCD with at least one aperture in the pixel electrodes and the width of the aperture is the same or longer that the width of the defectively oriented region of the liquid crystal molecules.

In contrast, Hirata is completely silent as to such a feature and does not teach or suggest a defectively oriented region of the liquid crystal layer.

Therefore, as described above, it would not have been obvious to a person of ordinary skill in the art to provide an LCD with at least one aperture in the pixel electrodes and where a width of the aperture is the same or longer than the width of the defectively oriented region of the liquid crystal molecules.

Hence, turning to the clear language of independent claim 20 (and similarly of independent claim 23), Hirata neither teaches nor suggests "*[a] liquid crystal display (LCD), comprising:*

a first substrate;

a second substrate opposing to said first substrate;

liquid crystal molecules sandwiched between said first substrate and said second substrate;

a plurality of pixel electrodes formed on said first substrate;

an alignment layer formed on said pixel electrodes which orients said liquid crystal molecules on said alignment layer to an alignment direction;

wherein a plurality of differently oriented regions are formed in said alignment layer on each of said plurality of pixel electrodes,

each of said pixel electrodes comprises at least one aperture formed under a boundary between said adjacent differently oriented regions of said alignment layer, and

a minimum width of the at least one aperture of said pixel electrode is equal to a width of a defectively oriented region of said liquid crystal molecules on a boundary of said adjacent differently oriented regions of said alignment layer" (emphasis Applicant's).

For the reasons stated above, independent claim 20 (and substantially similarly independent claim 23) of the claimed invention is fully patentable over Hirata.

In addition, new claims 24-28 are also fully patentable by virtue of the novel and unobvious features and limitations which they recite.

III. FORMAL MATTERS AND CONCLUSION

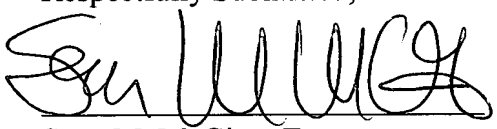
Regarding the Examiner's objection to the Drawings, the Examiner asserts that "at least one aperture" means there are more than one aperture, which should be shown. However, Applicant respectfully disagrees and notes that "at least one" signifies one or more. As such, the Drawings taken in combination with the specification and the claims are correct in showing one aperture.

In view of the foregoing, Applicant submits that claims 20, 22, and 24-28, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims have been amended as follows:

20. (Amended) A liquid crystal display (LCD), comprising:

a first substrate;

a second substrate opposing to said first substrate;

liquid crystal molecules sandwiched between said first substrate and said second substrate;

a plurality of [pixels] pixel electrodes formed on said first substrate; [,] and

an alignment layer formed on said pixel electrodes which orients said liquid crystal molecules on said alignment layer to an alignment direction,

wherein [each pixel of said plurality of pixels being formed of] a plurality of differently oriented regions are formed in said alignment layer on each of said plurality of pixel electrodes[;],[and]

[an] each of said pixel electrodes [electrode with] comprises at least one aperture formed under [along] a boundary between said adjacent differently oriented regions of said alignment layer[;], and

[wherein] a minimum width of the at least one aperture of said pixel electrode is equal to a width of a defectively oriented region of said liquid crystal molecules [in the] on a boundary of said adjacent differently oriented regions of said alignment layer.

22. (Amended) A method of fabricating a liquid crystal display (LCD), comprising:

forming a plurality of pixel electrodes on a first substrate,

forming at least one aperture [on an] in each of said pixel [electrode] electrodes;

depositing an alignment layer over the resultant surface processed in said forming at least one aperture; [and]

generating differently oriented regions and a boundary between said differently oriented regions in the alignment layer on said each of said pixel electrodes;

and

sandwiching liquid crystal molecules between said first substrate and a second substrate opposing to said first substrate,

wherein a minimum width of the at least one aperture of said each of said pixel electrodes is equal to a width of a defectively oriented region of said liquid crystal molecules on a boundary of said adjacent differently oriented regions of said alignment layer.